Compaq ProLiant BL20p Server Blade

Maintenance and Service Guide

Part Number 316080-001

January 2003 (First Edition)

This document provides detailed instructions for maintenance and service personnel. It includes removal and replacement procedures, spare parts information, an overview of diagnostic tools, locations for interface components, and related specifications for the Compaq *ProLiant*™ BL20p server blade.

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About This Guide

This maintenance and service guide is a troubleshooting guide that can be used for reference when servicing Compaq ProLiant BL20p server blades.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

Compaq Technician Notes

WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Disconnect power from the system by unplugging all power cords from the power supplies.**
- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- *Compaq ProLiant BL p-Class System Setup and Installation Guide*
- *Compaq ProLiant BL p-Class System Hardware Installation and Configuration* Poster
- *Compaq Servers Troubleshooting Guide*
- *Compaq Altiris eXpress Deployment Server for Compaq ProLiant Servers User Guide*
- *Compaq Integrated Lights-Out User Guide*
- *Compaq ROM-Based Setup and Utility User Guide*
- White paper: *Compaq ProLiant BL p-Class System Overview and Planning*
- White paper: *Configuring a Preboot eXecution Environment (PXE) using Red Hat Linux 7.2 on Compaq ProLiant Servers*
- QuickSpecs
- *Compaq Service Quick Reference Guide*
- Service training guides
- Compaq service advisories and bulletins

- Compaq *QuickFind*™ information services
- *Compaq Insight Manager*™ software

For additional information or copies of these documents, visit the Compaq website:

www.compaq.com

Integrated Management Log

The server blade includes an integrated, nonvolatile management log that contains fault and management information. The contents of the Integrated Management Log (IML) can be viewed with Compaq Insight Manager 7.

Telephone Numbers

For the name of the nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For Compaq technical support:

- In the United States and Canada, call 1-800-OK COMPAQ.
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website:

  www.compaq.com

Text Conventions

This document uses the following conventions:

- *Italic type* is used for complete titles of published guides or variables. Variables include information that varies in system output, in command lines, and in command parameters in text.
- **Bold type** is used for emphasis, for onscreen interface components (window titles, menu names and selections, button and icon names, and so on), and for keyboard keys.
- `Monospace typeface` is used for command lines, code examples, screen displays, error messages, and user input.
- Sans serif typeface is used for uniform resource locators (URLs).

1

Illustrated Parts Catalog

This chapter provides illustrated parts and spare parts lists for the Compaq ProLiant BL20p server blade components. Refer to Tables 1-1 through 1-6 for the names of referenced spare parts.

ProLiant BL20p Server Blade Components

Server Blade Exploded View

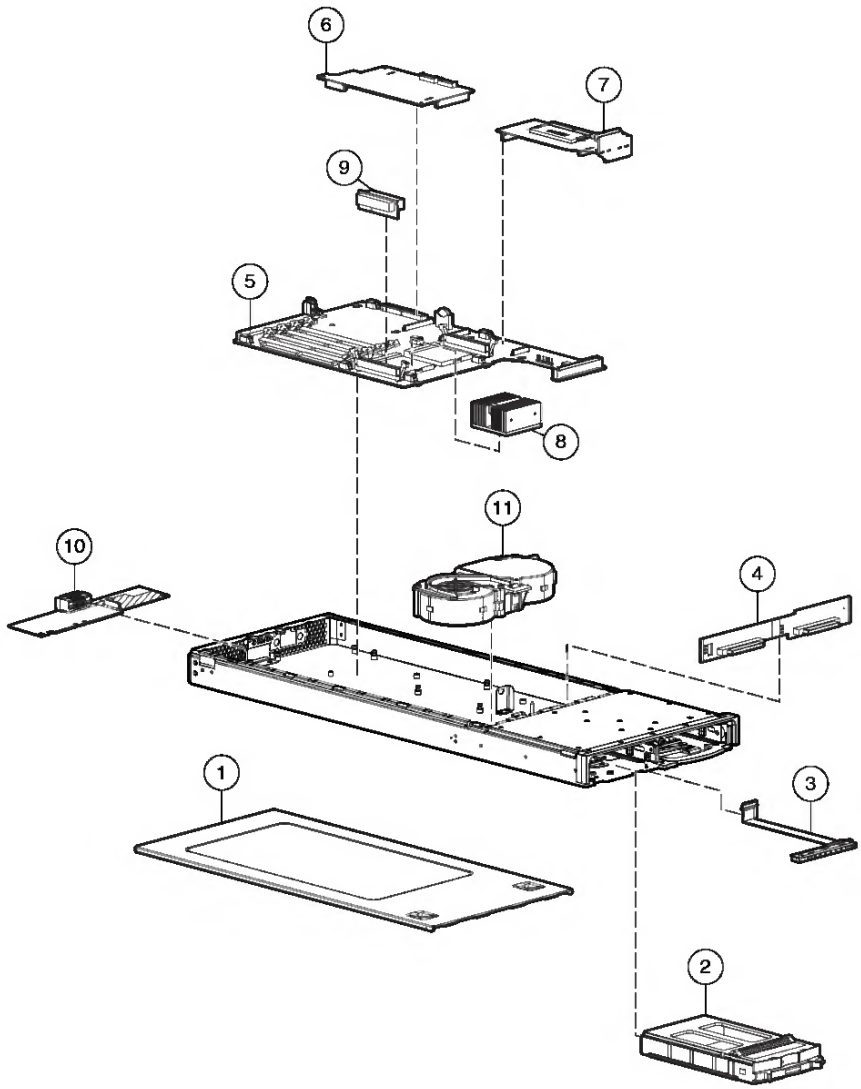

Figure 1-1: Server blade exploded view

Server Blade Spare Parts List

Table 1-1: Server Blade Spare Parts List

Item	Description	Spare Part Number
	Mechanical Components	
1	Access panel	237570-001
2	Hard drive blank	122759-001
	Boards	
3	Power button/LED board	237552-001
4	SCSI backplane	237551-001
5	System board	237505-001
6	Compaq NC3163 Fast Ethernet NIC Embedded 10/100 WOL	237555-001
7	Compaq Smart Array 5i Controller module	237550-001
	System Components	
8	Intel Pentium III processor assembly, 1.4 GHz	237504-001
9	Processor power module (PPM)	237553-001
10	Power converter module, 190 W	237554-001
11	Blower assembly	237569-001
	Miscellaneous	
12	Plastics and hardware kit *	237583-001
	Bezel assembly	—
	Anchor pins (4)	—
	EMI fastener clips	—
	Ejector latch	—
	System board thumbscrew	—
13	Replacement battery, 3-V lithium *	234556-001
14	ProLiant BL20p server blade return kit *	237582-001
	Memory	
15	DIMM, 128-MB, registered 133-MHz SDRAM *	159226-001
16	DIMM, 256-MB, registered 133-MHz SDRAM *	159304-001
17	DIMM, 512-MB, registered 133-MHz SDRAM *	159227-001
18	DIMM, 1-GB, registered 133-MHz SDRAM *	163902-001
* Not shown		

continued

Table 1-1: Server Blade Spare Parts List *continued*

Item	Description	Spare Part Number
	Options	
20	Dual NC7780 Gigabit (NIC) upgrade module *	237585-001
21	Battery-Backed Write Cache Enabler, with cable *	260740-001

* Not shown

2

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for system components. After completing all necessary removal and replacement procedures, verify that all components operate properly by running the appropriate diagnostic software:

- For server blade components, run the Compaq Server Diagnostics utility, available from the Compaq website:

  www.compaq.com

- For server blade enclosure and power enclosure components, run the infrastructure diagnostics. Refer to Chapter 3, "Diagnostic Tools," for more information.

Safety Considerations

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Always be properly grounded when touching a static-sensitive component or assembly.
- Use conductive field service tools.

Server Blade Warnings and Cautions

WARNING: To reduce the risk of shock or injury from high current electrical energy, do not remove the server blade access panel while the server blade is installed in the server blade enclosure. Do not remove the server blade access panel and then install the server blade into the server blade enclosure.

WARNING: Setting the server blade Power On/Standby button to the standby position removes power from most areas of the server blade. This process may take 30 seconds, during which time some internal circuitry remains active. To remove power completely, remove the server blade from the server blade enclosure.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: When performing non-hot-plug operations, you must power down the server blade and/or the system. However, it may be necessary to leave the server blade powered up when performing other operations, such as hot-plug installations or troubleshooting.

Rack Warnings and Cautions

WARNING: The power supply enclosure and the server blade enclosure are very heavy. To reduce the risk of personal injury or damage to the equipment:

- **Observe local occupational health and safety requirements and guidelines for manual material handling.**
- **Remove hot-plug power supplies and server blades from their enclosures before installing or removing the enclosures.**
- **Use caution and get help to lift and stabilize enclosures during installation or removal, especially when the enclosure is not fastened to the rack.**

WARNING: Always use at least two people to lift a power supply enclosure or server blade enclosure into the rack. If the enclosure is being loaded into the rack above chest level, a third person MUST assist with aligning the enclosure with the rails while the other two people support the weight of the enclosure.

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling jacks of the rack are extended to the floor.**
- **The full weight of the rack rests on the leveling jacks.**
- **The stabilizers are attached to the rack if it is a single rack installation.**
- **The racks are coupled in multiple rack installations.**

WARNING: When installing the server blade enclosure in a telco rack, be sure that the rack frame is adequately secured to the building structure.

WARNING: To reduce the risk of personal injury or damage to the equipment, at least two people are needed to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 m (7 ft) tall, and may become unstable when being moved on its casters. Do not only stand in front of the rack as it rolls down the ramp from the pallet, but handle the rack from both sides.

WARNING: To reduce the risk of shock or injury from high current electrical energy, do not reach into a server blade enclosure once it has been installed in a rack and connected to a working rack bus bar. Do not touch the power or data backplanes within the server blade enclosure once it has been installed.

WARNING: To reduce the risk of shock or injury from high current electrical energy, do not reach into a power supply enclosure once it has been installed in a rack and connected to a power source. Do not touch the connectors within the power supply enclosure once it has been installed.

WARNING: To reduce the risk of shock or injury from high current electrical energy, do not opening any access covers on the rack bus bar after it has been connected to a power source.

CAUTION: Protect equipment from power fluctuations and temporary interruptions with a regulating UPS device or battery bank. This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

CAUTION: Always ensure that equipment is properly grounded before beginning any installation procedure. Electrostatic discharge resulting from improper grounding can damage electronic components. For more information, refer to the setup and installation guide.

Symbols on Equipment

25 kg
55 lb

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching it.

To reduce the risk of injury from electric shock hazards, do not open this enclosure.

WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of electric shock hazards. The enclosed area contains no operator serviceable parts.

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Server Blade Components

Use the procedures in this section to perform service events on ProLiant BL20p server blades.

Server Blade Preparation

To service any internal server blade component, you must power down the server blade and remove it from the server blade enclosure.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. For more information, refer to the "Electrostatic Discharge Information" section in this chapter.

System power in server blades does not completely shut off witb the front panel Power On/Standby switch or Integrated Lights-Out (iLO) Virtual Power Button feature. The function toggles between on and standby modes, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active.

To service internal server blade components:

1. Identify the proper server blade in the server blade enclosure.
2. Remove power from the server blade in one of the following ways:
   - Use the Virtual Power Button feature in the iLO Remote Console to power down the server blade from a remote location. Be sure that the server blade is in standby mode by observing that the power LED is amber.
   - Press the Power On/Standby button on the front of the server blade. Be sure that the server blade is in standby mode by observing that the power LED is amber.

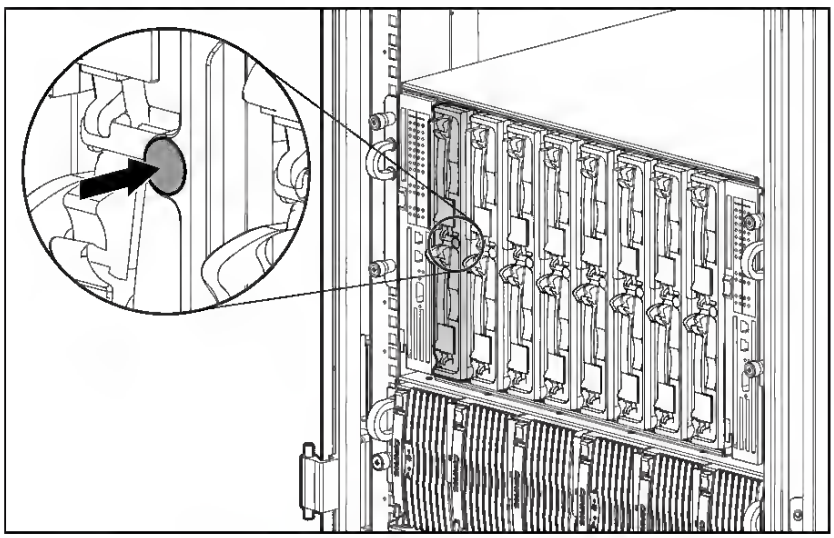

Figure 2-1: Pressing the Power On/Standby button

CAUTION: After you press the release button, the server blade is unlocked from the enclosure. Use both hands to support the server blade when you remove it from the rack.

3. Remove the server blade from the server blade enclosure:
   a. Press the release button (1).
   b. Open the lever (2).
   c. Grasp the lever and slide the server blade from the enclosure (3). Place a hand under the server blade to support it as you remove it from the enclosure.

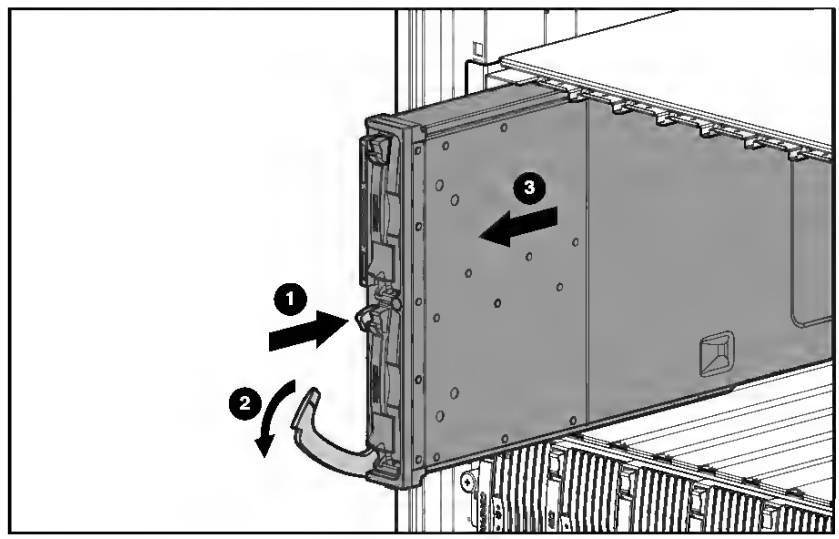

Figure 2-2: Removing the server blade from the server blade enclosure

   d. Place the server blade on a flat, level surface.

CAUTION: Always populate server blade enclosure bays with either a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank results in improper airflow and improper cooling that can lead to thermal damage.

Reverse steps 1 through 3 to install and power up a server blade. Server blades are set to power up automatically upon insertion. If you have changed this setting, use the Power On/Standby button or iLO Virtual Power Button feature to power up the server blade.

For more information about iLO, refer to the *Compaq Integrated Lights-Out User Guide*.

Access Panel

To remove the access panel:

1. Power down the server blade and remove it from tbe server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Loosen the thumbscrew (1).
3. Press down on the thumb indentations, slide the access panel toward the rear of the unit about 1.25 cm (0.5 in), and lift to remove the panel (2).

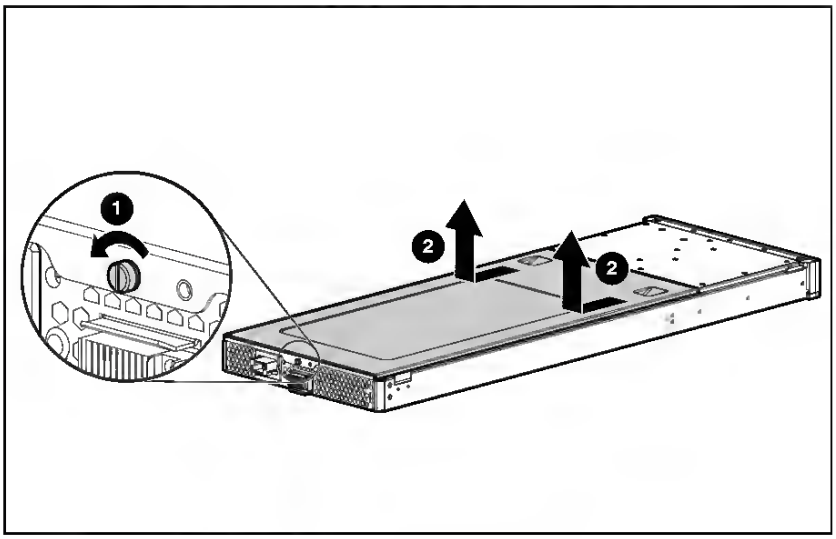

Figure 2-3: Removing the server blade access panel

Reverse steps 1 through 3 to replace the access panel.

Hard Drive Blanks

To remove a hard drive blank:

1. Press the release buttons simultaneously (1).
2. Pull the blank out of the drive bay (2).

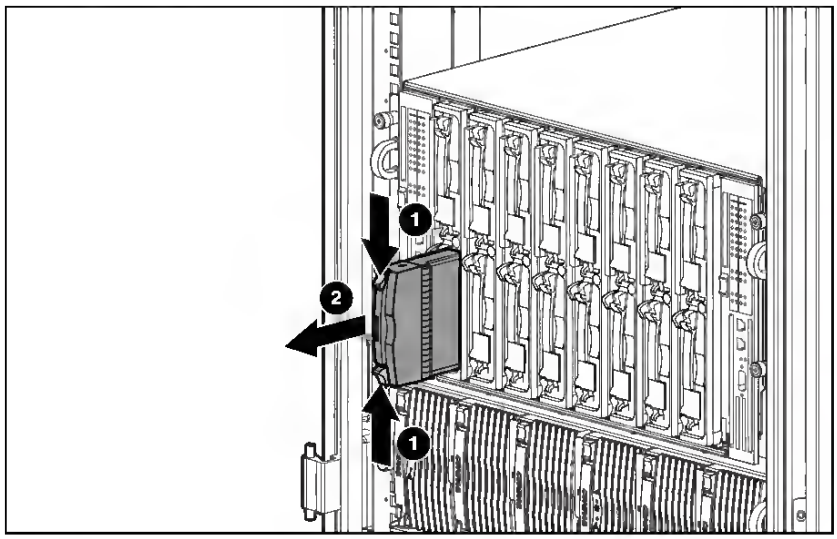

Figure 2-4: Removing a hard drive blank

CAUTION: Always populate hard drive bays with either a hot-plug SCSI hard drive or hard drive blank. Operating the server blade without a hot-plug SCSI hard drive or hard drive blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace the hard drive blank, slide the blank into the bay until it locks into place.

Hot-Plug SCSI Hard Drives

To assess hard drive status, observe the hot-plug SCSI hard drive status LEDs. For a detailed explanation of these LEDs, refer to Chapter 4, "Connectors, LEDs, and Switches."

CAUTION: Read "Hot-plug Hard Drive Replacement Guidelines" in the *Compaq Servers Troubleshooting Guide* before removing a hard drive.

IMPORTANT: It is not necessary to power down the server blade before removing or replacing a hot-plug SCSI hard drive.

To remove a hot-plug SCSI hard drive:

1. Press the release button (1).
2. Open the ejector lever (2).
3. Slide the drive out of the drive cage (3).

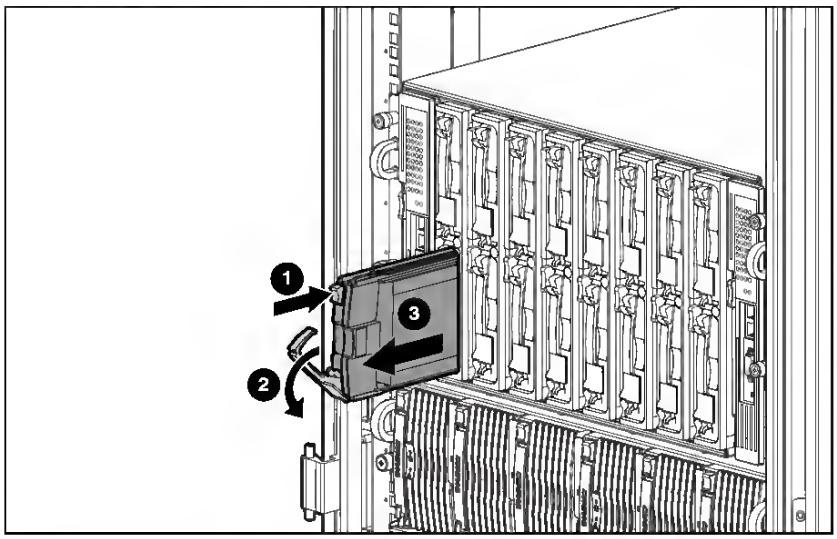

Figure 2-5: Removing a hot-plug SCSI hard drive

CAUTION: Always populate hard drive bays with either a hot-plug SCSI hard drive or hard drive blank. Operating the server blade without a hot-plug SCSI hard drive or hard drive blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace a hot-plug SCSI hard drive:

1. Slide the drive into the cage until it is fully seated.
2. Close the lever, locking the drive into place.

DIMMs

To remove a DIMM:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.

   NOTE: The server blade ships with at least two DIMMs installed in slots 1A and 2A.

3. Open the DIMM slot latches (1).
4. Remove the DIMM from the slot (2).

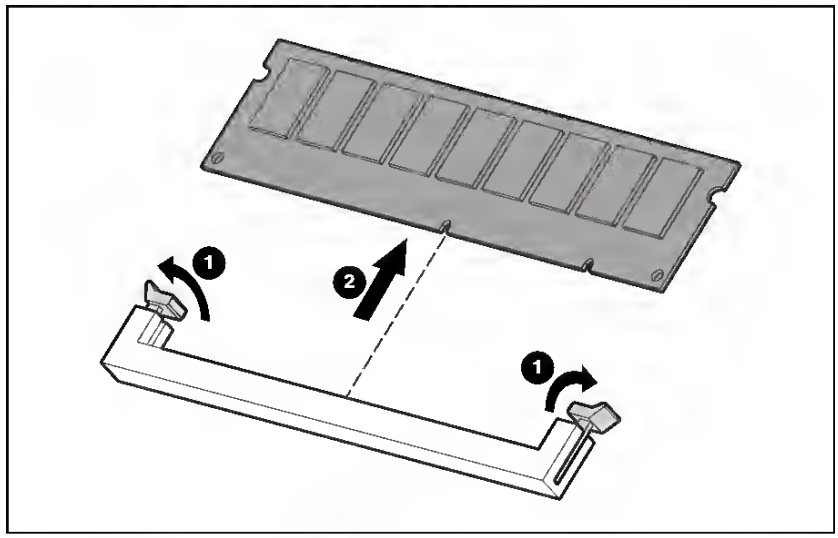

Figure 2-6: Removing a DIMM

CAUTION: For proper DIMM configuration, refer to the setup and installation guide.

CAUTION: Use only Compaq DIMMs. DIMMs from other sources may adversely affect data integrity.

IMPORTANT: Always install DIMMs in identical pairs.

IMPORTANT: DIMMs do not seat fully if turned the wrong way.

Reverse steps 1 through 4 to replace a DIMM.

Processor Power Module

To remove a PPM:

1. Power down the server blade and remove it from tbe server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Open the latches on the sides of the PPM slot (1).
4. Remove the PPM from the slot (2).

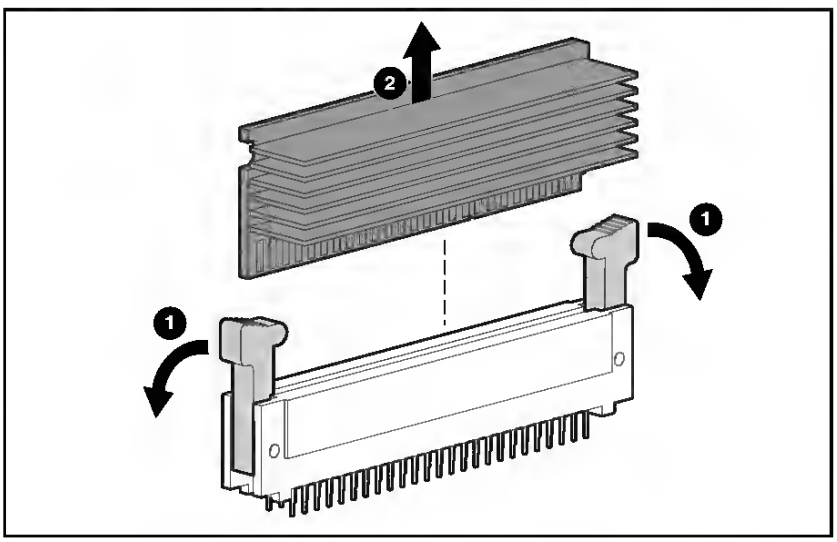

Figure 2-7: Removing a PPM

Reverse steps 1 through 4 to replace the PPM.

Processor Assembly

To remove a processor assembly:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.

CAUTION: Always disengage the heatsink clip **before** raising the processor ejector lever to avoid damaging the pins.

3. Disengage the retaining clip (1). Be sure that the clip unfastens from both sides of the processor socket.
4. Lift the ejecting lever (2).
5. Remove the processor assembly (3).

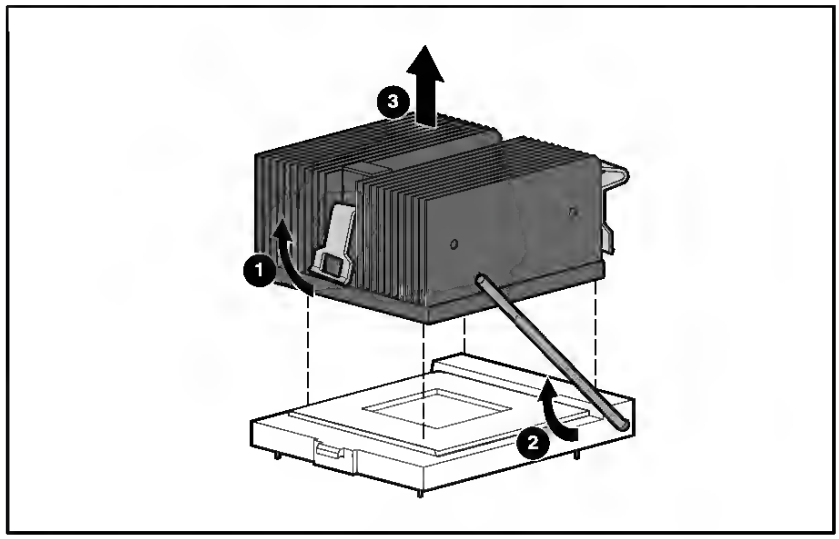

Figure 2-8: Removing a processor assembly

CAUTION: Do not disassemble the processor assembly. Separating the parts damages them.

IMPORTANT: Align the pins with the socket before seating the processor assembly. The assembly is keyed to fit only one way.

Reverse steps 1 through 5 to replace the processor assembly.

Battery-Backed Write Cache Enabler

To remove the Battery-Backed Write Cache Enabler:

1. Power down the server blade and remove it from tbe server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Disconnect the Battery-Backed Write Cache Enabler cable from the Battery-Backed Write Cache Enabler (1).
4. Disconnect the Battery-Backed Write Cache Enabler cable from the Smart Array 5i Controller module (2).
5. Lift the Battery-Backed Write Cache Enabler to unseat it from the NIC module (3).

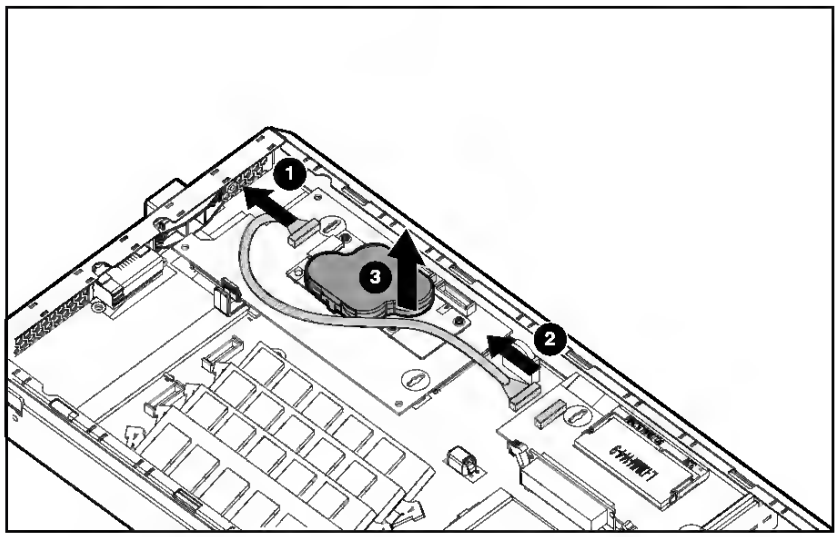

Figure 2-9: Removing the Battery-Backed Write Cache Enabler

Reverse steps 1 through 5 to replace the Battery-Backed Write Cache Enabler.

Blower Assembly

To remove the blower assembly:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Press the blower retention tabs (1).
4. Rotate the blower assembly up and lift it (2).

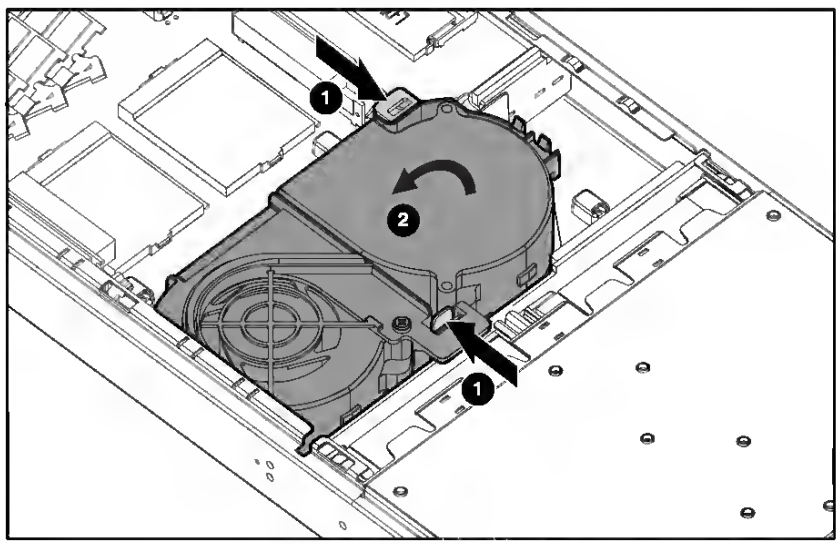

Figure 2-10: Removing a blower assembly

Reverse steps 1 through 4 to replace the blower assembly.

Compaq Smart Array 5i Controller Module

To remove the Compaq Smart Array 5i Controller module:

1. Power down the server blade and remove it from tbe server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Remove the blower assembly. Refer to the "Blower Assembly" section in this cbapter.
4. Disconnect the Battery-Backed Write Cache Enabler cable, if the option is installed (1).
5. Turn the anchor pins one-quarter turn counterclockwise (2).
6. Grasp the front and back of the module, near the connectors, and lift the module (3).

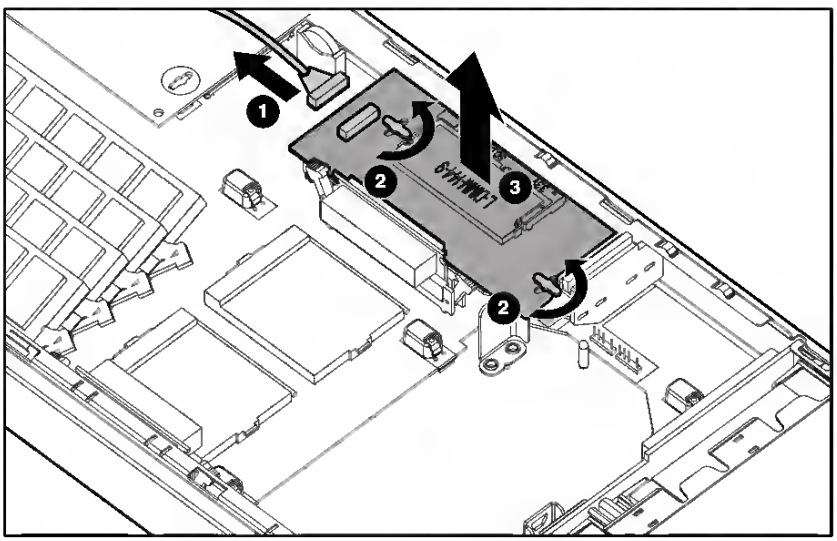

Figure 2-11: Removing the Smart Array 5i Controller

Reverse steps 1 through 6 to replace the Smart Array 5i Controller module.

NIC Modules

To remove either the standard NIC module or the Dual NC7780 Gigabit upgrade module:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Remove the Battery-Backed Write Cache Enabler, if the option is installed. Refer to the "Battery-Backed Write Cache Enabler" section in this chapter.
4. Turn the anchor pins one-quarter turn counterclockwise (1).
5. Press the retaining tab outward from the module (2).
6. Grasp the front and back of the module, near the connectors, and lift the module (3).

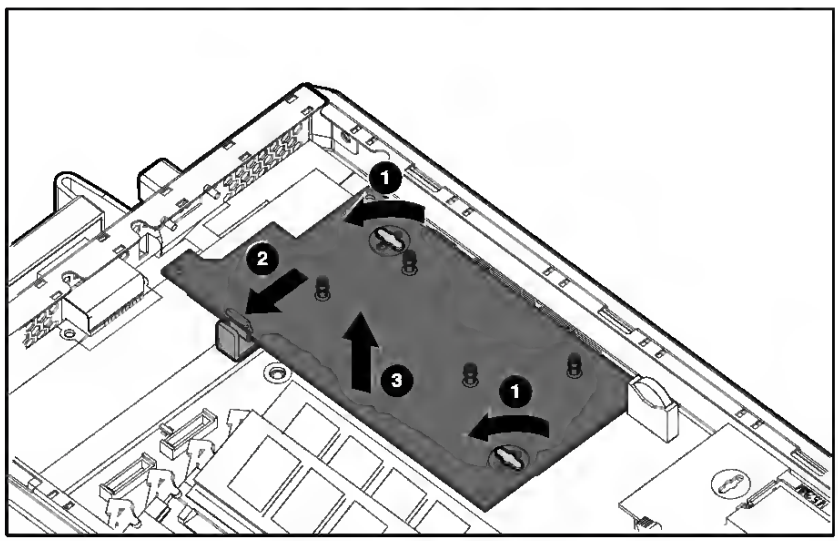

Figure 2-12: Removing the NIC module

Reverse steps 1 through 6 to replace a NIC module.

SCSI Backplane

To remove the SCSI backplane:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Remove any hot-plug SCSI hard drives or hard drive blanks:
   - If any hard drive blanks are installed, refer to the "Hard Drive Blanks" section in this chapter.
   - If any hot-plug SCSI hard drives are installed, refer to the "Hot-Plug SCSI Hard Drives" section in this chapter.
4. Remove the blower assembly. Refer to the "Blower Assembly" section in this chapter.
5. Grasp the SCSI backplane above the system board SCSI connector and lift slightly (1).
6. Disconnect the power button/LED board cable from the SCSI backplane (2).
7. Lift the SCSI backplane out of the chassis (3).

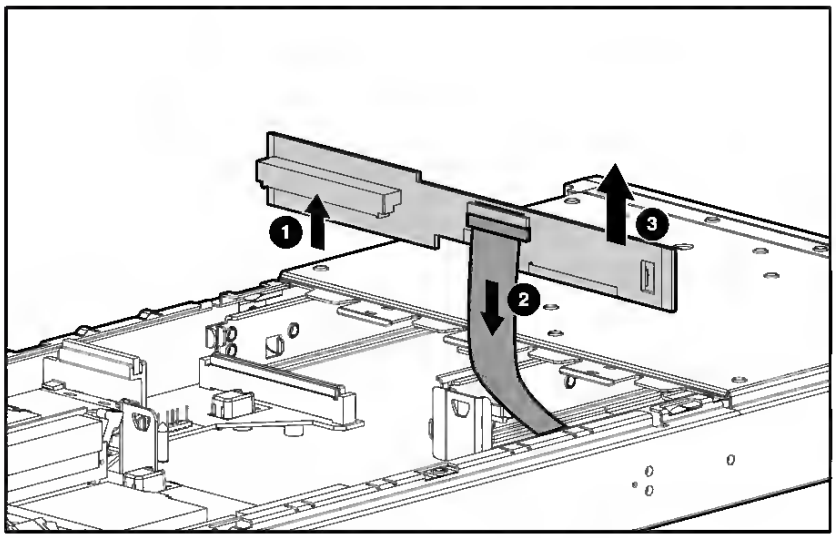

Figure 2-13: Removing the SCSI backplane

Reverse steps 1 through 7 to replace the SCSI backplane.

Power Button/LED Board

To remove the power button/LED board:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Remove any hot-plug SCSI hard drives or hard drive blanks:
   - If any hard drive blanks are installed, refer to the "Hard Drive Blanks" section in this chapter.
   - If any hot-plug SCSI hard drives are installed, refer to the "Hot-Plug SCSI Hard Drives" section in this chapter.
4. Remove the blower assembly. Refer to the "Blower Assembly" section in this chapter.
5. Remove the SCSI backplane. Refer to the "SCSI Backplane" section in this chapter.
6. Remove the two retaining screws from the bottom of the chassis (1).
7. Slide the power button/LED board toward the outside edge of the chassis (2).

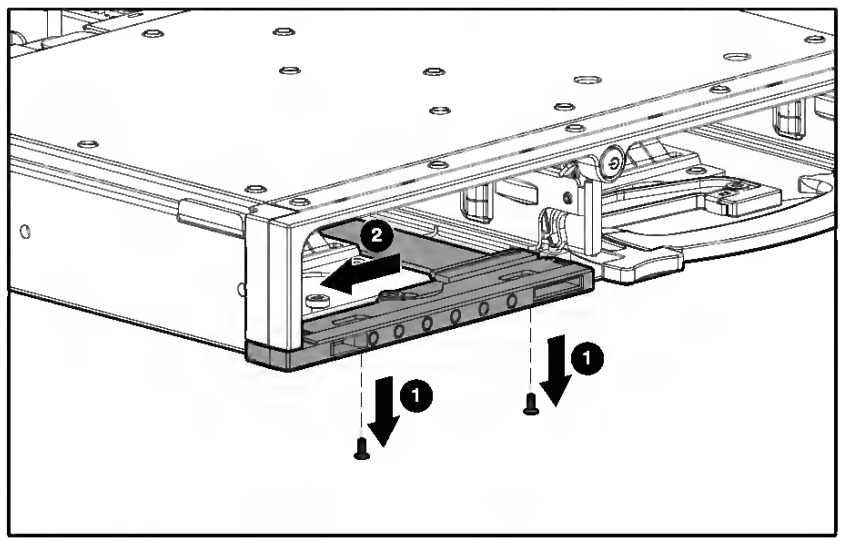

Figure 2-14: Removing the power button/LED retaining screws

8. Tilt the front edge of the power button/LED board down until the keyholes on the rear of the board clear the alignment pins (1).
9. Slide the power button/LED board out of the front of the chassis (2).

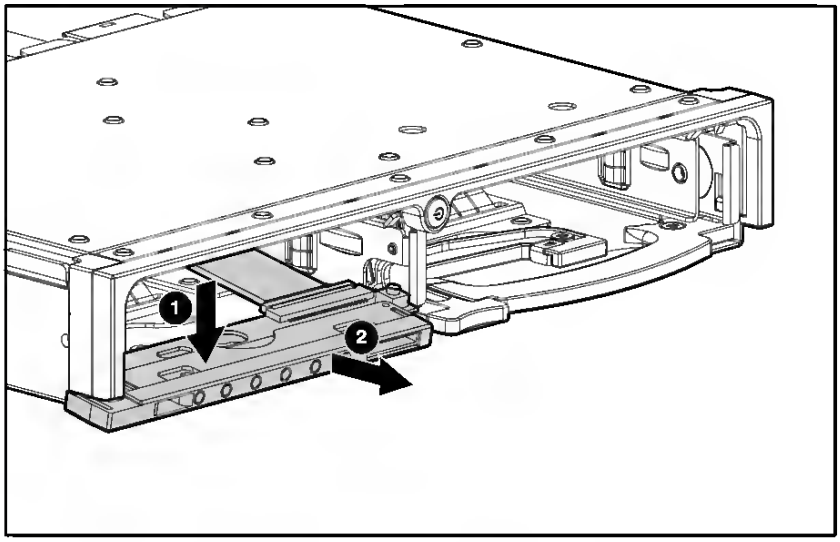

Figure 2-15: Removing the power button/LED board

Reverse steps 1 through 9 to replace the power button/LED board.

Battery

If the server blade no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

WARNING: This server blade contains either an internal lithium manganese dioxide or a vanadium pentoxide battery. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- **Do not attempt to recharge the battery.**
- **Do not expose to temperatures higher than 60°C.**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

CAUTION: Loss of BIOS settings will occur if the lithium battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.

CAUTION: Batteries, battery packs, and accumulators should not be disposed of along with general household waste. In order to forward them for recycling or proper disposal, please use the public collection system or return them to your authorized partners or their agents.

IMPORTANT: Run the System Utility to configure the system after replacing the battery. Refer to the *Compaq ProLiant BL p-Class System Setup and Installation Guide* for more information.

To remove the system board battery:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Locate the battery holder on the system board.

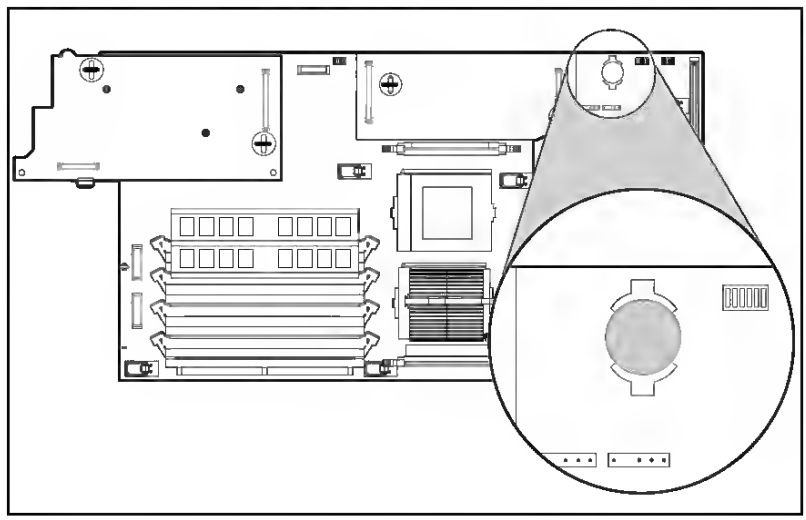

Figure 2-16: Battery holder

4. Open the battery retaining clip. The edge of the battery springs upward.

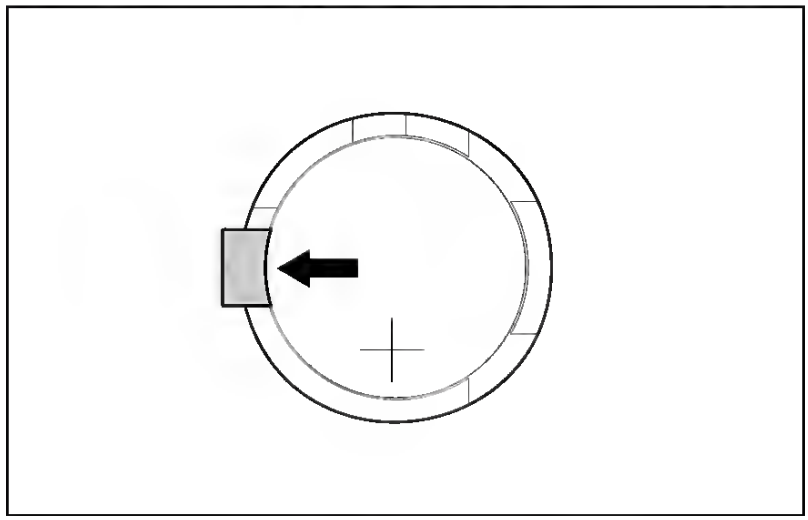

Figure 2-17: Opening the battery retaining clip

5. Remove the battery.

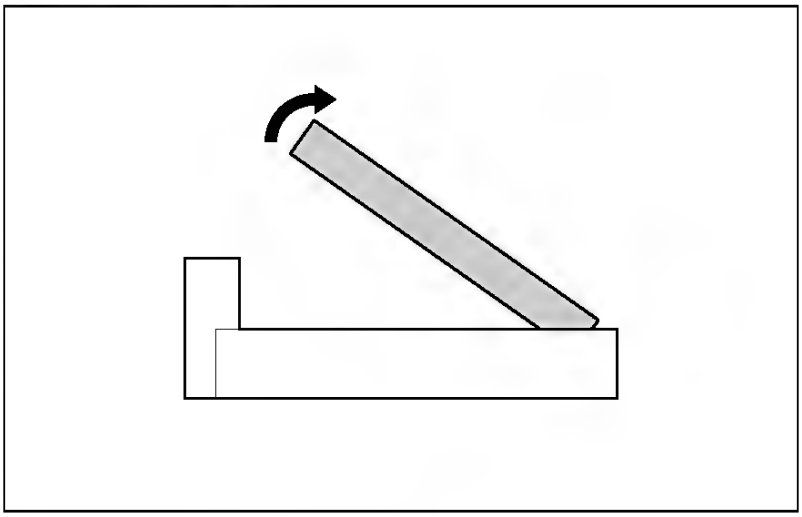

Figure 2-18: Removing the battery

Reverse steps 1 through 5 to replace the system board battery.

System Board

To remove the system board:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the "Server Blade Preparation" section in this chapter.
2. Remove the access panel. Refer to the "Access Panel" section in this chapter.
3. Remove the DIMMs. Refer to the "DIMMs" section in this chapter.
4. Remove the PPMs. Refer to the "Processor Power Module" section in this chapter.
5. Remove the processor assemblies. Refer to the "Processor Assembly" section in this chapter.
6. Remove the Battery-Backed Write Cache Enabler, if the option is installed. Refer to the "Battery-Backed Write Cache Enabler" section in this chapter.
7. Remove the blower assembly. Refer to the "Blower Assembly" section in this chapter.
8. Remove the Compaq Smart Array 5i Controller module. Refer to the "Compaq Smart Array 5i Controller Module" section in this chapter.
9. Remove the NIC module. Refer to the "NIC Modules" section in this chapter.
10. Remove the SCSI backplane. Refer to the "SCSI Backplane" section in this chapter.
11. Remove the system board battery. Refer to the "Battery" section in this chapter.
12. Loosen the system board thumbscrew.

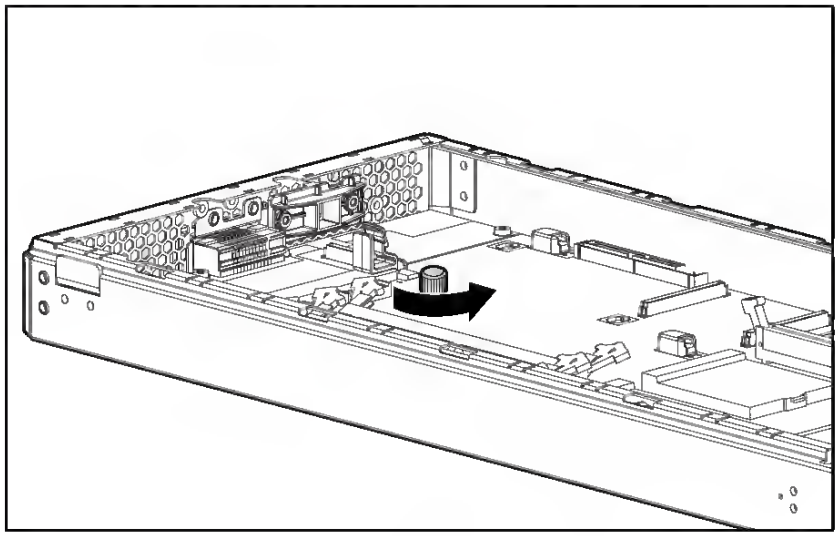

Figure 2-19: Loosening the system board thumbscrew

13. Identify the alignment keys and keyhole locations (1) through (7) on the system board.

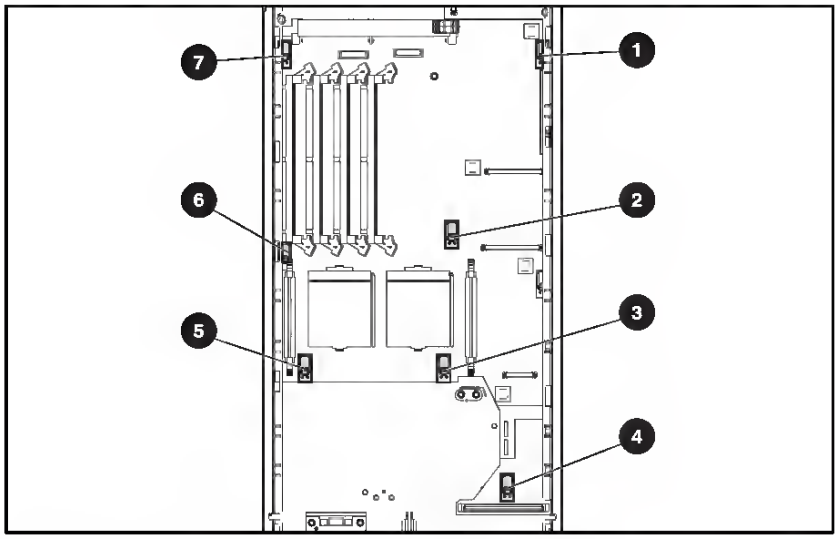

Figure 2-20: Identifying alignment keys and keyhole locations

14. Slide the system board toward the front of the server blade. Be sure that the board unseats from the power converter module and all the alignment keys.
15. Lift the system board until it comes off the alignment keys.

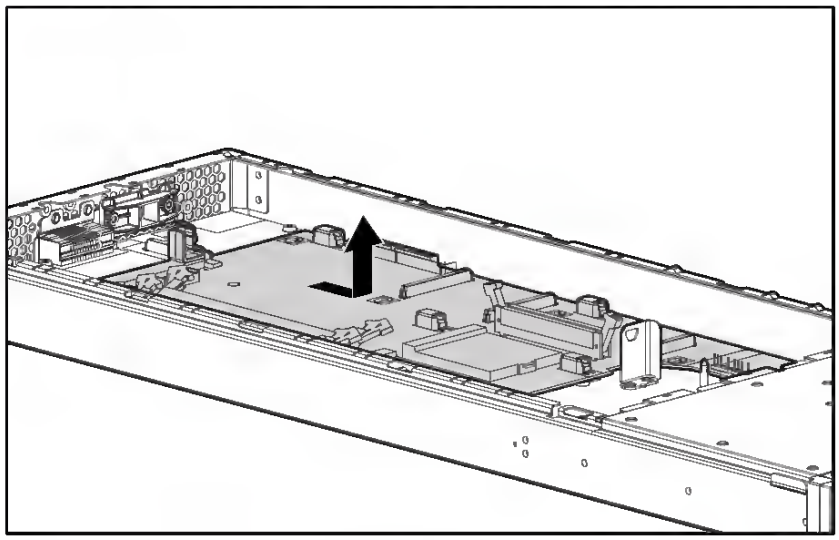

Figure 2-21: Disengaging the system board

16. Lift the edge of the system board nearest the DIMM slots (1). The edge of the system board nearest the Smart Array 5i Controller module connectors tilts down into the chassis. The edge of the system board nearest the DIMM slots tilts up out of the chassis.
17. Lift the system board out of the chassis (2).

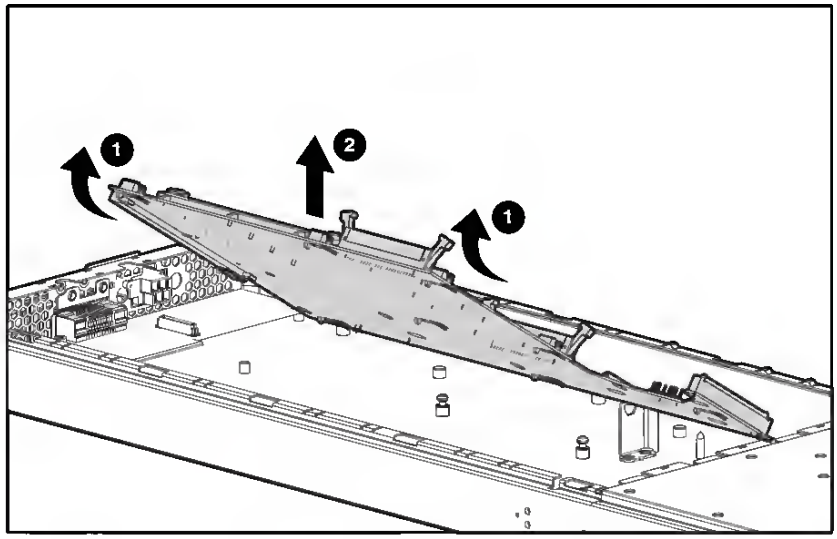

Figure 2-22: Removing the system board

Reverse steps 1 through 17 to replace the system board.

Server Blade Blanks

To remove a server blade blank:

1. Press the release buttons simultaneously (1).
2. Slide the server blade blank from the server blade enclosure (2).

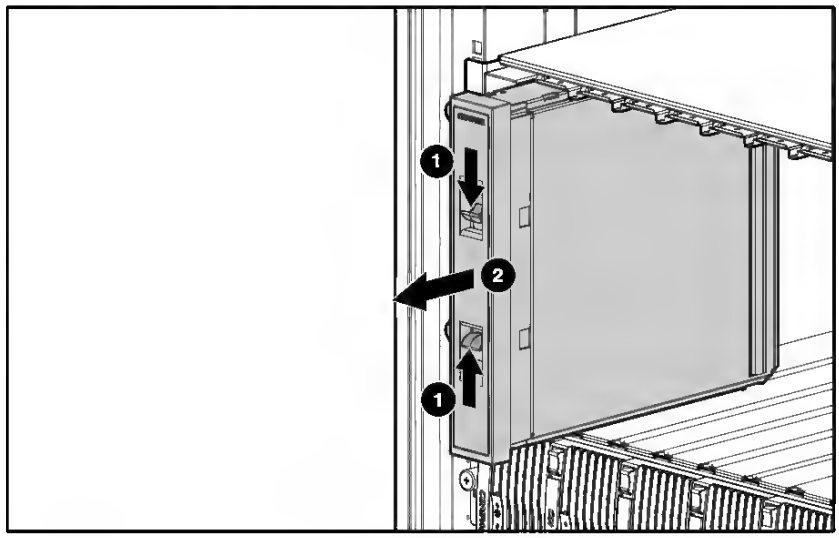

Figure 2-23: Removing a server blade blank

CAUTION: Always populate server blade enclosure bays with either a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace a server blade blank, align the blank with the empty bay and slide it in until the blank is fully seated.

3

Diagnostic Tools

This chapter is an overview of software and firmware diagnostic tools that are available for configuring, monitoring, and managing the system.

ProLiant BL p-Class Diagnostic Tools

Use the following tools to diagnose problems, test hardware, and monitor and manage system operations.

Table 3-1: Diagnostic Tools

Tool	Description	How to run the tool
Array Diagnostics Utility (ADU)	ADU is designed to run on all Compaq systems that support Compaq array controllers. ADU collects information about the array controllers in the system and generates a list of detected problems.	For a list of Compaq systems that support ADU, visit the Compaq website: www.compaq.com/support/files For a complete list of ADU error messages, refer to the *Compaq Servers Troubleshooting Guide*.
Automatic Server Recovery-2 (ASR-2)	ASR-2 automatically restarts the server blade after a catastrophic operating system failure. With ASR-2, you have multiple recovery options: • Available Recovery provides software error recovery and environmental recovery. • Unattended Recovery logs the error information to the IML, resets the server blade, and tries to restart the operating system.	Run RBSU and set ASR-2 to enable this tool.
Compaq Diagnostics	Compaq Diagnostics tests and verifies operation of Compaq hardware. If Compaq Diagnostics finds a hardware failure, it isolates the replaceable part, if possible.	Access Compaq Diagnostics when POST detects a system configuration error. For a complete list of POST error messages, refer to the *Compaq Servers Troubleshooting Guide*. Compaq Diagnostics can be downloaded from the Compaq website: www.compaq.com/support/files
Compaq Insight Manager 7	Compaq Insight Manager 7 is a client/server application used to remotely manage Compaq hardware in a network environment. Compaq Insight Manager reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information on viewing and printing the event list, refer to the *Compaq Insight Manager User Guide* or the setup and installation guide.
Compaq *ROMPaq*™ Utility	The ROMPaq Utility checks the system and provides a choice of available ROM revisions and controller firmware.	You can download this utility from the Compaq website: www.compaq.com

continued

Table 3-1: Diagnostic Tools *continued*

Tool	Description	How to run the tool
Compaq Survey Utility	Compaq Survey Utility gathers critical hardware and software information on server blades. If a significant change occurs between data-gathering intervals, the survey utility marks the previous information and overwrites the survey text files to reflect the latest changes in the configuration.	The Compaq Survey Utility is available on the ProLiant Essential Rapid Deployment Pack CD or on the Compaq website: www.compaq.com/support/files/servers/us/index.html
Integrated Lights-Out ROM-Based Setup Utility (iLO RBSU)	The iLO RBSU is the recommended method to configure and set up the iLO. The iLO RBSU is designed to assist you with setting up an iLO on a network; it is not intended for continued administration.	Run iLO RBSU by pressing the **F8** key during POST.
Integrated Management Log (IML)	The IML is a log of system events such as system failures or nonfatal error conditions. View events in the IML from within: • Compaq Insight Manager 7 • Compaq Survey Utility • Operating system-specific IML utilities	The IML requires Compaq operating system management drivers. Refer to the ProLiant Essentials Rapid Deployment Pack CD for instructions on installing the appropriate drivers.
Option ROM Configuration for Arrays (ORCA)	The Option ROM Configuration for Arrays Utility is a menu-driven utility that does not require a CD and can be started when the server blade is booting. This utility enables users to perform the following functions: • Create, configure, and/or delete logical drives. • Specify RAID levels. • Assign online spares. • Set interrupts and the boot controller order.	Run ORCA by pressing the **F8** key during POST.
ProLiant Essentials Rapid Deployment Paq	The optional ProLiant Essentials Rapid Deployment Paq is the preferred method for rapid, high-volume server blade deployments. The Rapid Deployment Paq includes Altiris eXpress Deployment Server and the Compaq *SmartStart*™ Scripting Toolkit.	Install the CD in the CD-ROM drive of the administrator workstation or client PC and refer to the documentation that ships with the software.
ROM-Based Setup Utility (RBSU)	RBSU configures the hardware installed in the server blade. This utility enables users to perform the following functions: • Store configuration information in nonvolatile memory. • Manage memory installation, processor upgrades, network interface cards and mass storage devices. • Assist in installing an operating system. • Configure ports and IRQs, if required.	Run RBSU by pressing the **F9** key during POST.

Firmware Upgrades for Management Modules

For information about upgrading server blade management module or power management module firmware, refer to the Compaq website:

www.compaq.com

4

Connectors, LEDs, and Switches

This chapter explains the location and function of system connectors, internal and external LEDs, and switches.

Connectors

Use the following sections to identify connectors on the following ProLiant BL p-Class system components:

- ProLiant BL20p server blades
- Server blade enclosures and server blade management modules
- Power enclosures and power management modules
- RJ-45 patch panels
- Interconnect switches
- Bus bars and power bus boxes
- Diagnostic cable and diagnostic station

ProLiant BL20p Server Blade

Front Panel Connectors

The server blade has one front panel connector, a diagnostic port that accepts the diagnostic cable for configuration and troubleshooting purposes.

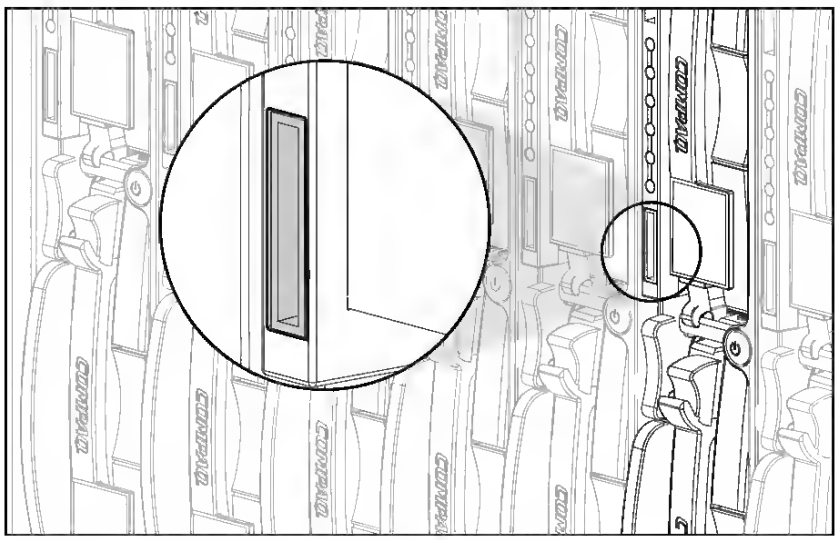

Figure 4-1: ProLiant BL20p diagnostic port

Rear Panel Connectors

Use the following figure and table to identify ProLiant BL20p server blade rear panel connectors.

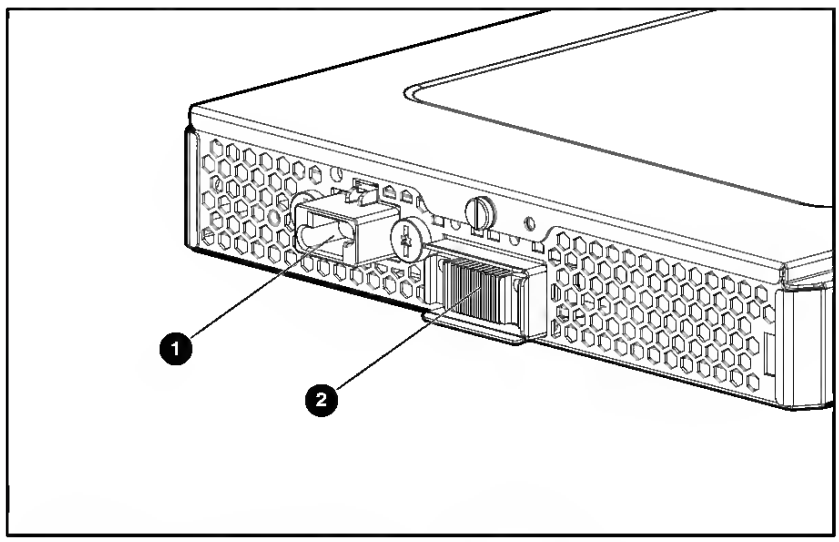

Figure 4-2: ProLiant BL20p server blade rear panel connectors

Table 4-1: ProLiant BL20p Server Blade Rear Panel Connectors

Item	Description
1	Power connector
2	Signal connector

System Board Components and Connectors

Use the following figure and table to identify ProLiant BL20p system board components and connectors.

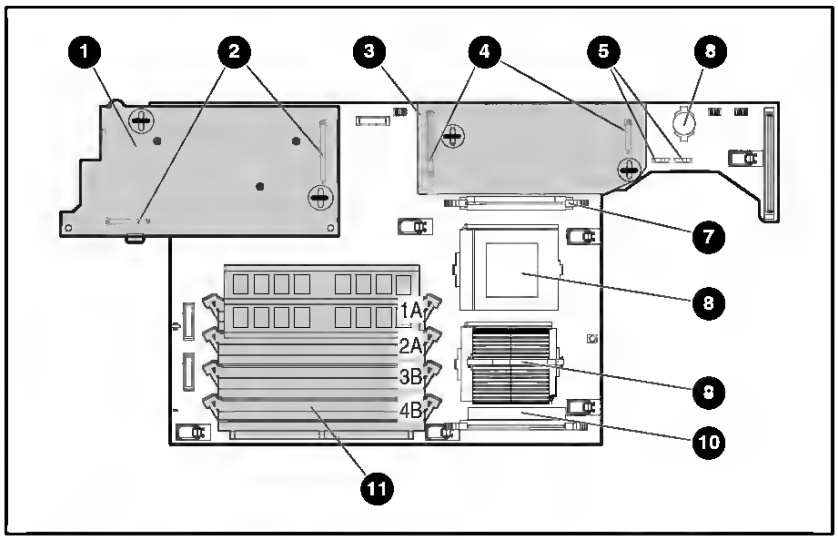

Figure 4-3: ProLiant BL20p system board components and connectors

Table 4-2: System Board Components and Connectors

Item	Description
1	NIC module
2	NIC module connectors
3	Smart Array 5i Controller module
4	Smart Array 5i connectors
5	Blower assembly connectors
6	Battery
7	Processor power module (PPM) slot 2
8	Processor socket 2
9	Processor socket 1 (populated)
10	PPM slot 1 (populated)
11	DIMM slots 1A through 4B

Diagnostic Cable

Use the following figure and table to identify diagnostic cable connectors.

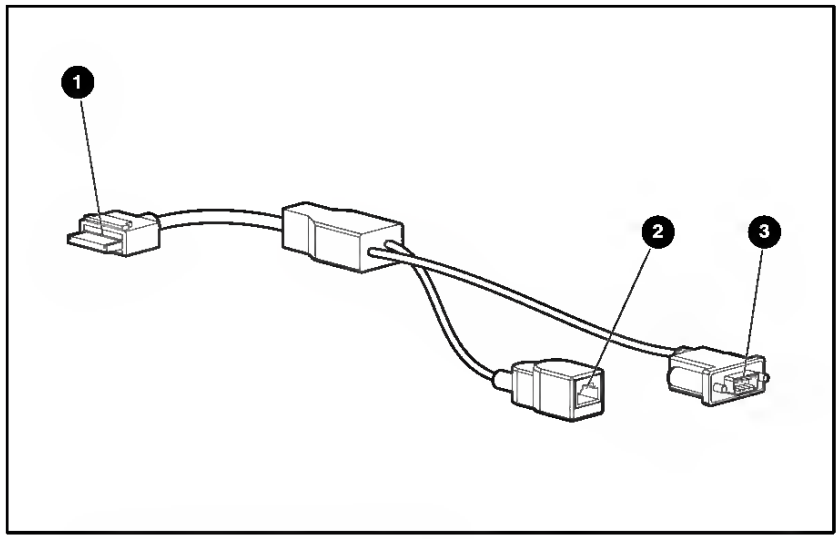

Figure 4-4: Diagnostic cable connectors

Table 4-3: Diagnostic Cable Connectors

Item	Description
1	Server blade connector
2	iLO RJ-45 (10/100 Ethernet) connector
3	Kernel debug connector

LEDs

Use the following section to identify LEDs on the following ProLiant BL p-Class system components:

- ProLiant BL20p server blade front panel
- Hot-plug SCSI hard drives

ProLiant BL20p Server Blade Front Panel

Six LEDs on the front of the server blade indicate server status. Use the following figure and table to identify LED locations and functions.

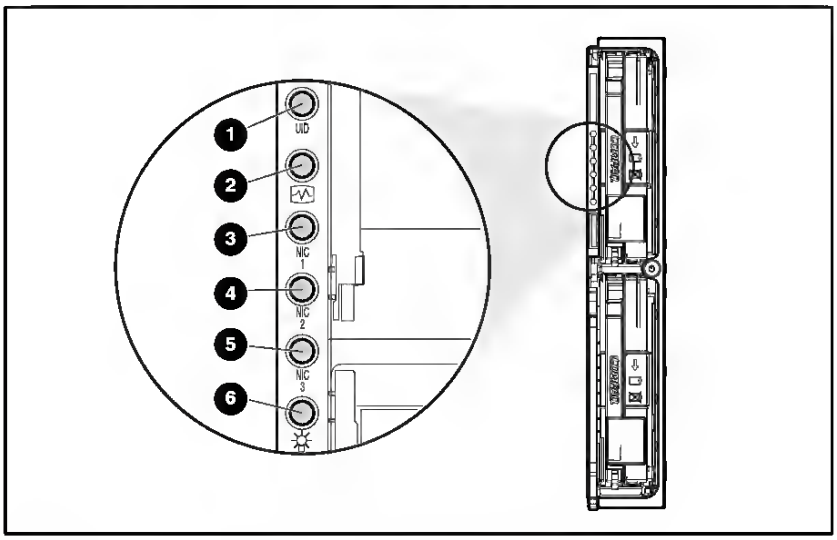

Figure 4-5: ProLiant BL20p server blade front panel LEDs

Table 4-4: ProLiant BL20p Server Blade Front Panel LEDs

Item	LED Description	Status
1	Unit identification	Blue = Flagged Blue flashing = Management mode Off = No remote management
2	Health	Green = Normal status Flashing = Booting Amber = Degraded status Red = Critical status
3	NIC 1	Green = Linked to network Green flashing = Network activity Off = No activity
4	NIC 2	
5	NIC 3	
6	Power On/Standby	Green = On Amber = Standby (power available) Off = Unit off

Hot-Plug SCSI Hard Drives

Each hot-plug SCSI hard drive has three LED indicators located on the front of the drive. The LEDs provide activity, online, and fault status for each corresponding drive when configured as a part of an array and attached to a powered-on Smart Array controller. Their behavior may vary depending on the status of other drives in the array. Use the following figure and table to identify LED locations and functions.

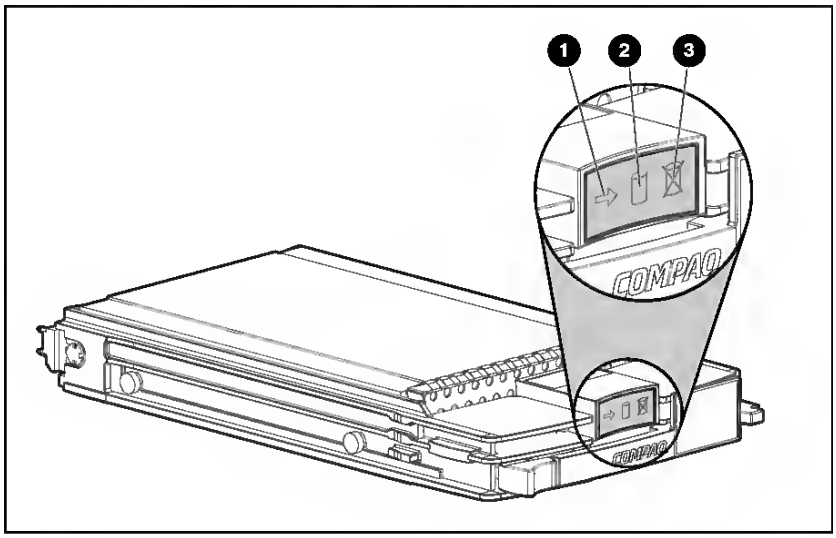

Figure 4-6: Hot-plug SCSI hard drive LEDs

Table 4-5: Hot-Plug SCSI Hard Drive LEDs

1 Activity	2 Online	3 Fault	Means
On	Off	Off	**Do not remove the drive. Removing a drive during this process causes data loss.** The drive is being accessed and is not configured as part of an array.
On	Flashing	Off	**Do not remove the drive. Removing a drive during this process causes data loss.** The drive is rebuilding or undergoing capacity expansion.
Flashing	Flashing	Flashing	**Do not remove the drive. Removing a drive during this process causes data loss.** The drive is part of an array being selected by the Array Configuration Utility. -Or- The Options ROMPaq is upgrading the drive.

continued

Table 4-5: Hot-Plug SCSI Hard Drive LEDs *continued*

1 Activity	2 Online	3 Fault	Means
Off	Off	Off	OK to replace the drive online if a predictive failure alert is received (refer to the following section for details) and the drive is attached to an array controller. The drive is not configured as part of an array. -Or- If this drive is part of an array, then a powered-on controller is not accessing the drive. -Or- The drive is configured as an online spare.
Off	Off	On	OK to replace the drive online. The drive has failed and has been placed off-line.
Off	On	Off	OK to replace the drive online if a predictive failure alert is received (refer to the following section for details), provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
On or flashing	On	Off	OK to replace the drive online if a predictive failure alert is received (refer to the following section for details), provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and being accessed.

Switches

Use the following sections to identify the locations and functions of push-button and system switches.

Buttons

Use the following section to identify push-button switches on the system hardware.

Power On/Standby Button

Setting the server blade Power On/Standby button to the standby position removes power from most areas of the server blade. This process may take 30 seconds, during which time some internal circuitry remains active.

Use the following figure to identify the button location.

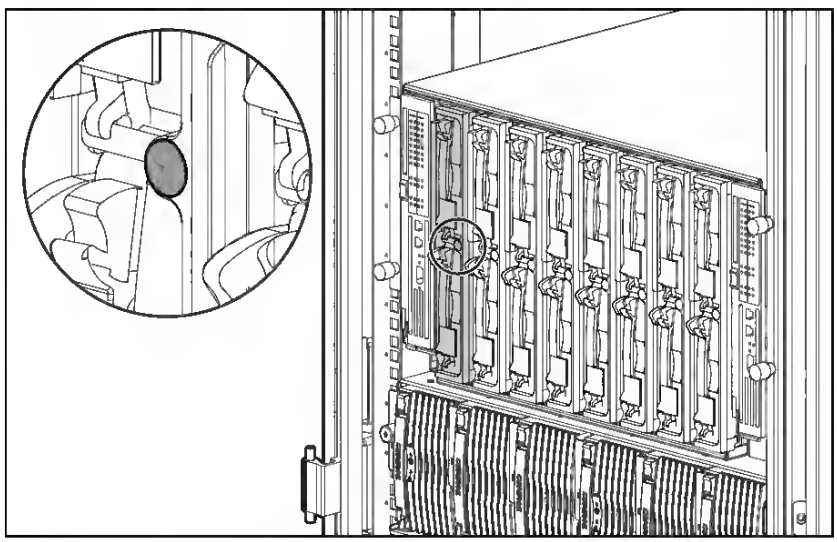

Figure 4-7: Power On/Standby button

System Switches

System switches enable you to change certain settings or to perform advanced diagnostic procedures. The following sections explain the functions of each switch. Use the following figure and table to identify switch locations and functions.

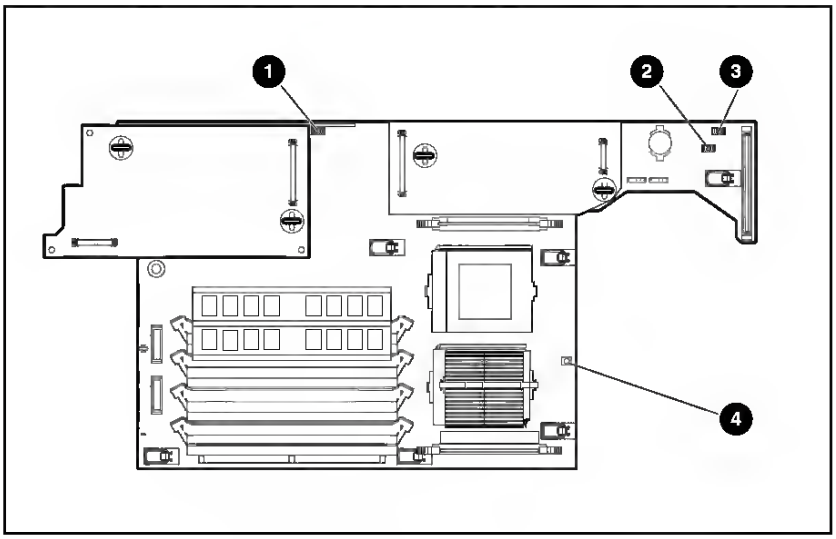

Figure 4-8: Server blade system switches

Table 4-6: Server Blade System Switches

Item	Description
1	iLO switch (SW2)
2	System switch (SW3)
3	System configuration switch (SW1)
4	Non-maskable interrupt (NMI) switch

iLO Switch (SW2)

The iLO switch is a four-position switch that grants you access to perform a boot block flash of system ROM and iLO ROM. For the proper system configuration switch settings, refer to the following table or the labels attached to the inside of the server access panel.

Table 4-7: iLO Switch (SW2) Settings

Position	Description	On/Off Function
1	Reserved	—
2	iLO security override	Off = iLO security is enabled; iLO access requires a valid user ID and password. Also, the iLO boot block access is disabled and the iLO boot block cannot be flashed. On = iLO security is disabled; iLO access is possible without a valid user ID or password. Also, the iLO boot block access is enabled and the iLO boot block can be flashed.
3	Reserved	—
4	Reserved	—

System Switch (SW3)

The function for this switch is reserved.

CAUTION: Do not change any SW3 settings or the system may not function properly.

However, if settings have been changed inadvertently, reset the positions to the default settings.

Table 4-8: System Switch (SW3) Settings

Position	Description	Default Setting
1	Reserved	Off
2	Reserved	Off
3	Reserved	Off
4	Reserved	Off

System Configuration Switch (SW1)

The system configuration switch is a four-position switch that enables access to server blade hardware settings. The default setting for all four positions is off. For the proper system configuration switch settings, refer to the following table or the labels attached to the inside of the server blade access panel.

Table 4-9: System Configuration Switch (SW1) Settings

Position	Description	On/Off Function
1	Reserved	—
2	Configuration lock	Off = System configuration can be modified. On = System configuration is locked and cannot be modified.
3	Password clear	Off = Power-on password is enabled. On = Power-on password is disabled.
4	Invalidate configuration	Off = No function On = ROM treats the system configuration as invalid.

NMI Switch

Crash dump analysis is an essential part of eliminating reliability problems such as hangs or crashes in operating systems, device drivers, and applications. Crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that supports root cause analysis.

Systems running Microsoft Windows 2000 experience a blue screen trap when the operating system crashes. When this happens, Microsoft recommends that system administrators perform an NMI event by pressing a dump switch. The NMI event allows a hung system to become responsive.

The ProLiant BL20p server blade is equipped with an NMI switch that, when pushed, performs a memory dump before performing a hard reset. The NMI switch is for use by trained service personnel only.

System Configuration Switch Procedures

When you perform troubleshooting steps, this guide may instruct you to perform the following procedures:

- Clear the system configuration.
- Access the redundant ROM.

To complete these procedures, you must change physical settings on the system configuration switch (SW1). For switch locations and positions, refer to the "System Configuration Switch (SW1)" section in this chapter.

Clearing the System Configuration

To clear the system configuration:

1. Power down the server blade:
   - — Press the Power On/Standby button on the front of the server blade.
   - — Use the virtual power button feature in the iLO remote console.
2. Disconnect the server blade from all power sources:
   - — Remove the server blade from the enclosure and set it on a flat, level surface.
   - — Disconnect the server blade from the diagnostic station.
3. Remove the access panel. Refer to the "Access Panel" section in Chapter 2, "Removal and Replacement Procedures."
4. Change position 4 of SW1 to on.
5. Install the access panel. Refer to the "Access Panel" section in Chapter 2, "Removal and Replacement Procedures."
6. Connect the server blade to system power:
   - — Install the server blade in the enclosure.
   - — Connect the server blade to the diagnostic station.
7. Power up the server blade:
   - — Press the Power On/Standby button on the front of the server blade.
   - — Use the virtual power button feature in the iLO remote console.
8. Wait for the POST message that prompts you to change the switch setting:

   ```
   Maintenance switch detected in the "On" position.
   Power off the server and turn switch to the "Off" position.
   ```

9. Repeat steps 1 through 3.
10. Change position 4 of SW1 to off.
11. Repeat steps 5 through 7.

IMPORTANT: When the server blade boots after NVRAM is cleared, a delay of up to 2 minutes is normal. During this delay, the system appears non-functional. Do not attempt any procedures during the delay.

Accessing the Redundant ROM

If the system ROM is corrupted, you can set the system to use the backup version or redundant ROM.

To use the redundant ROM:

1. Power down the server blade:
   - — Press the Power On/Standby button on the front of the server blade.
   - — Use the virtual power button feature in the iLO remote console.
2. Disconnect the server blade from all power sources:
   - — Remove the server blade from the enclosure and set it on a flat, level surface.
   - — Disconnect the server blade from tbe diagnostic station.
3. Remove the access panel. Refer to the "Access Panel" section in Chapter 2, "Removal and Replacement Procedures."
4. Change positions 1 and 4 of SW1 to on.
5. Install the access panel. Refer to the "Access Panel" section in Chapter 2, "Removal and Replacement Procedures."
6. Connect the server blade to system power:
   - — Install the server blade in the enclosure.
   - — Connect the server blade to the diagnostic station.
7. Power up the server blade:
   - — Press the Power On/Standby button on the front of the server blade.
   - — Use the virtual power button feature in the iLO remote console.
8. As soon as the server blade powers up, it emits two beeps.
9. Repeat steps 1 through 3.
10. Change positions 1 and 4 of SW1 to off.
11. Repeat steps 5 through 7.

If both the current and backup versions of the ROM are corrupt, you must return the system board for a service replacement. For spare part numbers, refer to Chapter 1, "Illustrated Parts Catalog."

5

Specifications

This chapter provides operating and performance specifications for the following Compaq ProLiant BL p-Class system components:

- ProLiant BL20p server blade
- Memory
- Wide Ultra3 SCSI hard drives

ProLiant BL20p Server Blade

Table 5-1: Operating and Performance Specification for a ProLiant BL20p Server Blade

Specification	Value
Dimensions	
Width	26.14 cm (10.29 in)
Depth	71.12 cm (28.00 in)
Height	4.29 cm (1.69 in)
Weight (maximum)	8.17 kg (18.0 lb)
Temperature range[1]	
Operating	10° to 35°C (50° to 95°F)
Nonoperating:	
Shipping	-40° to 60°C (-40° to 140°F)
Storage	-20° to 60°C (-4° to 140°F)
Relative humidity (noncondensing)[2]	
Operating	10% to 90%
Non-operating:	
Shipping	10% to 90%
Storage	10% to 95%
Maximum wet bulb temperature	28°C (82°F)

[1]Operating temperature has an altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft). No direct sunlight. Upper operating limit is 3,048 m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

[2]Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage is 70 KPa.

Memory

Table 5-2: SDRAM DIMM Specifications

Item	Description
Size	128 MB, 256 MB, 512 MB,1 GB
Speed	133 MHz
Width	72 bits
Upgrade requirement *	Any combination of like-paired SDRAM DIMMs that provide a minimum of 256 MB

* Use only 128-, 256-, 512-MB, or 1-GB, 72-bit wide, 3.3 V, registered ECC SDRAM. SDRAM must be 133 MHz. Use Compaq SDRAM only.

Wide Ultra3 SCSI Hard Drives

Table 5-3: Operating and Performance Specifications for Wide Ultra3 SCSI Hard Drives

Item	9-GB SCSI Drive	18-GB SCSI Drive	36-GB SCSI Drive	72-GB SCSI Drive
Capacity	9100.0 MB	18,209.8 MB	36,419.6 MB	72,839.2 MB
Height	One-third, 1.0 in	One-third, 1.0 in	One-third, 1.0 in	One-third, 1.0 in
Size	3.5 in	3.5 in	3.5 in	3.5 in
Interface *	Wide Ultra3	Wide Ultra3	Wide Ultra3	Wide Ultra3
Transfer rate	160 MB/sec	160 MB/sec	160 MB/sec	160 MB/sec
Rotational speed	10,000 RPM	10,000 RPM	10,000 RPM	10,000 RPM
Bytes per sector	512	512	512	512
Logical blocks	17,773,524	35,566,080	71,132,000	142,264,000
Operating temperature	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)

* The ProLiant BL20p server blade also supports Ultra2 SCSI hard drives.

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